U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-254 917

JOHN H. KERR RESERVOIR, HALIFAX, AND MECKLENBURG COUNTIES, VIRGINIA, AND GRANVILLE, VANCE, AND WARREN COUNTIES, NORTH CAROLINA

PACIFIC NORTHWEST ENVIRONMENTAL
RESEARCH LABORATORY

PREPARED FOR
NATIONAL ENVIRONMENTAL RESEARCH CENTER

JUNE 1975

198137

PB 254 917

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LABORATORY

An Associate Laboratory of the

NATIONAL ENVIRONMENTAL RESEARCH CENTER - CORVALLIS, OREGON

and

NATIONAL ENVIRONMENTAL RESEARCH CENTER - LAS VEGAS, NEVADA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

REPORT
ON
JOHN H. KERR RESERVOIR
HALIFAX AND MECKLENBURG COUNTIES, VIRGINIA
AND
GRANVILLE, VANCE AND WARREN COUNTIES, NORTH CAROLINA
EPA REGIONS III AND IV
WORKING PAPER No. 462

WITH THE COOPERATION OF THE

VIRGINIA STATE WATER CONTROL BOARD

AND THE

VIRGINIA NATIONAL GUARD

JUNE, 1975

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.

4. TITLE AND SUBTITLE
Report on John H. Kerr Reservoir, Halifax and Mecklenburg Counties, Virginia, and Granville, Vance and Warren Counties, North Carolina

5. REPORT DATE
Prepared June, 1975

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
Anonymous (National Eutrophication Survey Staff)

8. PERFORMING ORGANIZATION REPORT NO.
Working Paper # 462

9. PERFORMING ORGANIZATION NAME AND ADDRESS
National Eutrophication Survey
U.S. Environmental Protection Agency
200 S. W. 35th St.
Corvallis, Oregon 97330

10. PROGRAM ELEMENT NO.

11. CONTRACT/GRANT NO.

12. SPONSORING AGENCY NAME AND ADDRESS
Office of Research and Development
U.S. Environmental Protection Agency
401 M Street, S. W.
Washington, DC 20460

13. TYPE OF REPORT AND PERIOD COVERED
Final - 1973

14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

PRICES SUBJECT TO CHANGE

KEY WORDS AND DOCUMENT ANALYSIS

DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading	ia	05B 05C

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited O.K. per Giglietti by phone	20. SECURITY CLASS (This page)	69 22. PRICE $4.50 - 2.25

EPA Form 2220-1 (9-73)

CONTENTS

	Page
Foreword	ii
List of Virginia Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	3
III. Lake Water Quality Summary	4
IV. Nutrient Loadings	8
V. Literature Reviewed	16
VI. Appendices	17

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Virginia State Water Control Board for professional involvement and to the Virginia National Guard for conducting the tributary sampling phase of the Survey.

Eugene T. Jensen, Executive Secretary of the State Water Control Board; Michael A. Bellanca, Director; Jean W. Gregory, Pollution Control Specialist; and Robert W. Pitchford, Pollution Control Technician; Bureau of Surveillance and Field Studies; provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

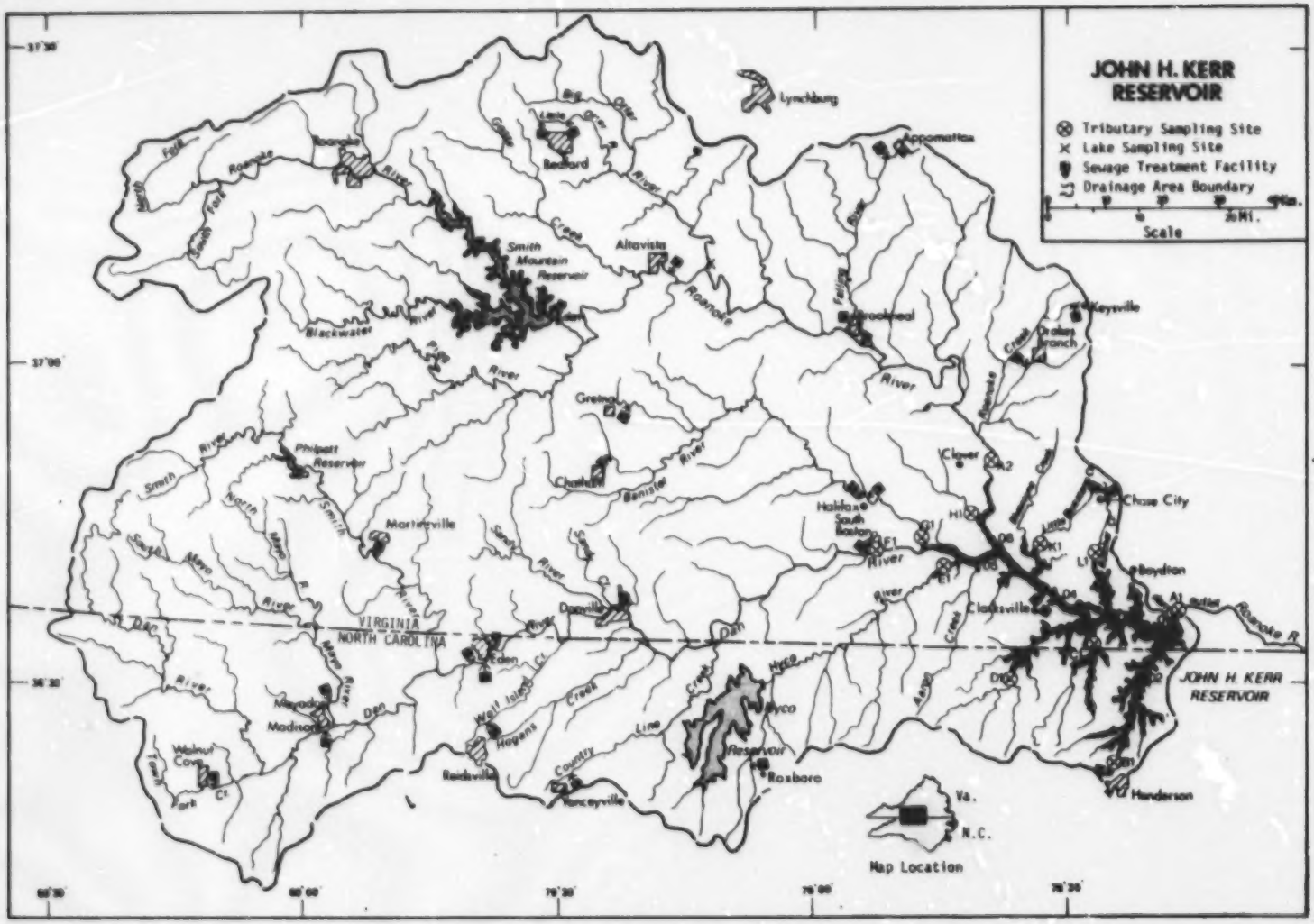
Major General William J. McCaddin, the Adjutant General of Virginia, and Project Officer Lt. Colonel James D. Manley, who directed the volunteer efforts of the Virginia National Guardsmen, also are gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF VIRGINIA

LAKE NAME	COUNTY
Bluestone	Giles, VA; Mercer, Monroe, Summers, WV
Chesdin	Amelia, Chesterfield, Dinwiddie
Chickahominy	Charles City, New Kent
Claytor	Pulaski
J. H. Kerr	Charlotte, Hallifax, Micklenburg, VA; Granville, Vance, Warren, NC
J. W. Flannagan	Dickenson
Occoquan	Fairfax, Prince William
Rivanna	Albemarle
Smith Mountain	Bedford, Franklin, Pittsylvania


JOHN H. KERR RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
Scale
20 Mi.
Lynchburg
Appomattox
Roanoke
Bedford
Smith Mountain Reservoir
Altavista
Brookneal
Keysville
Blackwater River
Staunton River
Phillpott Reservoir
Martinsville
Chatham
Banister River
Halifax
South Boston
Clover
Chase City
Boydton
Clarksville
Roanoke R.
VIRGINIA
NORTH CAROLINA
Danville
Dan River
Mayodan
Madison
Walnut Cove
Reidsville
Hogans Creek
Wall Island Cr.
Hyco Reservoir
Roxboro
Yanceyville
Country Line Creek
Hyco River
Aarons Creek
JOHN H. KERR RESERVOIR
Henderson
Va.
N.C.
Map Location
37°30'
37°00'
36°30'
80°30'
80°00'
79°30'
79°00'
78°30'

V

JOHN H. KERR RESERVOIR

STORET NO. 5106

I. CONCLUSIONS

A. Trophic Condition:

Survey data show that Kerr Reservoir is eutrophic. Of the eight Virginia water bodies sampled in 1973, John H. Kerr Reservoir ranked sixth in overall trophic quality using a combination of six parameters*. Three water bodies had less and one had the same median total phosphorus, four had less median dissolved phosphorus, two had less median inorganic nitrogen, three had less mean chlorophyll a, and four had greater mean Secchi disc transparency.

During their visits to the reservoir, Survey limnologists did not observe any nuisance conditions; however, dissolved oxygen was markedly depressed or depleted in the hypolimnion at most stations in July and was depleted at station 1 in September as well.

B. Rate-Limiting Nutrient:

Due to a loss of nutrients in the samples between the time of collection and the beginning of the algal assays, the results are not representative of conditions in the reservoir at the time the samples were taken (04/07/73). However, the reservoir data indicate phosphorus limitation at all sampling stations and times with the exception of station 5 which was nitrogen limited in April and September.

* See Appendix A.

C. Nutrient Controllability:

1. Point sources--The phosphorus load from known point sources amounted to about 34% of the total reaching the reservoir during the sampling year.

The existing phosphorus loading of 4.15 g/m^2/year is nearly four times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 15). While even complete removal of phosphorus at the point sources would still leave a loading about two times the eutrophic loading, it is likely that a high degree of phosphorus removal at the point sources would at least slow the rate of eutrophication of the reservoir.

2. Non-point sources--During the sampling year, the phosphorus load from non-point sources accounted for 66% of the total reaching the reservoir. The gaged tributaries contributed 65% of the total load and ranged from 33.0% (Dan River) to less than 0.1% (Nutbush Creek). The ungaged tributaries were estimated to have contributed 2.6% of the total load.

The phosphorus export rates of the reservoir tributaries do not appear to be excessive (see page 14) and compare well with the export rates of seven tributaries of upstream Smith Mountain Reservoir* (mean of 26 $kg/km^2/yr$; range of 7 to 41 $kg/km^2/yr$).

* Working Paper No. 465.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 198.25 kilometers^2.
2. Mean depth: 10.7 meters.
3. Maximum depth: >29.9 meters.
4. Volume: 2,121.275 x 10^6 m^3.
5. Mean hydraulic retention time: 124 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Roanoke River	8,381.2	82.5
Nutbush Creek	10.1	0.1
Island Creek	176.1	1.7
Grassy Creek	168.3	1.7
Hyco River	1,095.6	10.8
Dan River	7,073.3	68.1
Banister River	1,533.3	14.8
Difficult Creek	178.2	1.7
Little Bluestone Creek	84.2	0.8
Butcher Creek	58.3	0.6
Minor tributaries & immediate drainage -	1,193.4	15.0
Totals	19,952.0	197.8

2. Outlet -

Roanoke River	20,150.2**	197.8

C. Precipitation***:

1. Year of sampling: 123.8 centimeters.
2. Mean annual: 115.3 centimeters.

---

† Table of metric conversions--Appendix B.
†† Bellanca, 1975.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

John H. Kerr Reservoir was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from six stations on the reservoir and from a number of depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, two 18.9-liter depth-integrated samples were composited for algal assays (stations 1, 2, and 3 were combined; and stations 4, 5, and 6 were combined). Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 29.9 meters at station 1, 18.3 meters at station 2, 25.9 meters at station 3, 14.3 meters at station 4, 5.2 meters at station 5, and 5.2 meters at station 6.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR JOHN H. KERR RESERVOIR
STORET CODE 5106

PARAMETER	1ST SAMPLING (4/ 7/73) 6 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/13/73) 6 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/26/73) 6 SITES RANGE	MEAN	MEDIAN
TEMP (C)	10.3 - 14.4	12.9	13.1	16.9 - 29.3	25.6	26.2	20.1 - 25.7	24.3	24.7
DISS OXY (MG/L)	8.5 - 11.9	9.6	9.4	0.0 - 8.0	4.0	4.2	0.0 - 8.0	4.7	5.8
CNDCTVY (MCROMO)	75. - 115.	91.	90.	85. - 118.	102.	102.	95. - 154.	110.	108.
PH (STAND UNITS)	6.8 - 7.6	7.4	7.4	6.7 - 9.0	7.4	7.2	6.5 - 7.6	6.8	6.8
TOT ALK (MG/L)	12. - 40.	27.	27.	28. - 51.	37.	36.	25. - 47.	35.	36.
TOT P (MG/L)	0.023 - 0.176	0.064	0.062	0.011 - 0.104	0.038	0.035	0.018 - 0.203	0.054	0.039
ORTHO P (MG/L)	0.002 - 0.030	0.011	0.010	0.004 - 0.039	0.009	0.007	0.007 - 0.057	0.014	0.009
NO2+NO3 (MG/L)	0.070 - 0.310	0.233	0.250	0.040 - 0.350	0.163	0.160	0.020 - 0.230	0.072	0.060
AMMONIA (MG/L)	0.030 - 0.140	0.072	0.070	0.060 - 0.580	0.132	0.090	0.040 - 2.230	0.246	0.090
KJEL N (MG/L)	0.200 - 0.500	0.276	0.300	0.200 - 1.800	0.512	0.400	0.300 - 3.000	0.788	0.600
INORG N (MG/L)	0.100 - 0.420	0.305	0.320	0.100 - 0.630	0.295	0.255	0.070 - 2.290	0.319	0.180
TOTAL N (MG/L)	0.300 - 0.780	0.509	0.510	0.250 - 2.120	0.675	0.565	0.340 - 3.060	0.860	0.740
CHLRPYL A (UG/L)	2.6 - 23.2	8.4	3.7	3.6 - 19.2	8.4	5.3	4.4 - 15.8	9.7	8.6
SECCHI (METERS)	0.3 - 1.1	0.6	0.5	0.5 - 2.7	1.5	1.8	0.3 - 1.9	1.1	1.0

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/07/73	1. Melosira sp.	790
	2. Flagellates	244
	3. Dactylococcopsis sp.	115
	4. Stephanodiscus sp.	72
	5. Pennate diatoms	43
	Other genera	115
	Total	1,379
07/13/73	1. Lyngbya sp.	931
	2. Synedra sp.	667
	3. Flagellates	479
	4. Pennate diatoms	364
	5. Centric diatoms	223
	Other genera	1,466
	Total	4,130
09/26/73	1. Flagellates	1,523
	2. Raphidiopsis sp.	1,523
	3. Synedra sp.	1,044
	4. Aphanizomenon sp.	564
	5. Melosira sp.	479
	Other genera	1,891
	Total	7,024

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
04/07/73	01	14.2
	02	23.2
	03	4.2
	04	2.9
	05	2.6
	06	3.3

Sampling Date	Station Number	Chlorophyll a (µg/l)
07/13/72	01	3.6
	02	5.2
	03	5.3
	04	19.2
	05	11.9
	06	5.3
09/26/73	01	5.0
	02	15.6
	03	7.0
	04	15.8
	05	10.3
	06	4.4

C. Limiting Nutrient Study:

Due to a loss of nutrients in the assay samples between the time of collection and the beginning of the assays, the results are not representative of conditions in the reservoir at the time the samples were taken (04/07/73).

The reservoir data indicate phosphorus limitation at all sampling stations and times with the exception of station 5 which was nitrogen limited in April and September.

Following is a tabulation of the mean inorganic nitrogen/orthophosphorus ratios for each of the sampling stations and times with the indicated limiting nutrient in parentheses. Note that station 5, nearest the Dan River embayment which receives 77% of the point-source phosphorus load, tended toward nitrogen limitation.

Station	04/07/73	07/13/73	09/26/73
1	48/1 (P)	53/1 (P)	23/1 (P)
2	51/1 (P)	25/1 (P)	13/1 (N?)
3	30/1 (P)	55/1 (P)	16/1 (P)
4	23/1 (P)	35/1 (P)	15/1 (P)
5	12/1 (N)	18/1 (P)	5/1 (N)
6	40/1 (P)	37/1 (P)	15/1 (P)

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Virginia National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of May and June when two samples were collected. Sampling was begun in July, 1973, and was completed in June, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Virginia District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any. However, the nutrient loads in Nutbush Creek at station B-1 and Butcher Creek at station L-1 were less than the loadings measured at the upstream wastewater treatment plants, and the nutrient loads in these streams and the unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in $kg/km^2/year$, at stations D-1, E-1, H-1, and K-1 and multiplying the means by the Nutbush Creek, Butcher Creek, and ZZ areas in km^2.

The operators of the Henderson, NC; South Boston, VA; Danville, VA; Halifax (South Boston), VA; Clarksville, VA; Burlington Worsted (Clarks-

* See Working Paper No. 175.

ville), VA; Halifax Mills (Halifax), VA; Martinsville, VA; and Chase City, VA wastewater treatment plants provided monthly effluent samples and corresponding flow data. The operators of Yanceyville, NC; Roxboro, NC; Reidsville Plant #1, NC; Mayodan, NC; Madison, NC; Walnut Cove, NC; Altavista, VA; Chatham, VA; Drakes Branch, VA; Keysville, VA; Brookneal #1 and #2, VA; Appomattox #1, VA; Bedford #1 and #2, VA; Gretna, VA; and Eden (Mebane Bridge, Dry Creek, and Dan River Plants), NC, did not participate in the Survey, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year.

A. Waste Sources:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Eden, NC*				
Mebane Bridge	17,500	ext. aer.	26,495.0	Dan River
Dry Creek		ext. aer.	1,893.5	Dan River
Dan River		Walker process	567.7	Dan River
Henderson, NC***	13,500	tr. filter	4,811.9†	Nutbush Creek
Madison, NC**	1,800	tr. filter	946.2	Dan River
Mayodan, NC**	3,000	tr. filter	1,476.1	Mayo River
Reidsville, NC plant #1**	13,000	tr. filter	4,314.9	Little Troublesome Creek
Roxboro, NC***	10,000	prim. clarifier	9,311.1	Marlowe Creek
Walnut Cove, NC**	1,100	septic tanks	238.5	Town Fork Creek
Yanceyville, NC**	900	stab. pond	321.7	County Line Creek
Altavista, VA**	4,000	stab. pond	2,271.0	Roanoke River
Appomattox, VA plant #1**	1,000	tr. filter	378.5	Unnamed trib./ Falling River
Bedford, VA				
plant #1**	4,000	act. sludge	1,514.0	Johns Creek
plant #2**	1,975	stab. pond	1,495.1	Johns Creek

* McAlister, 1975.
** Anonymous, 1971.
*** Treatment plant questionnaire.
† More than 25% of the waste load is contributed by industry.

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Brookneal, VA				
plant #1*	550	stab. pond	283.9	Falling River
plant #2*	550	stab. pond	283.9†	Roanoke River
Burlington Worsted, Clarksville, VA**	600	aer. lagoon	10,745.0†	Unnamed trib./ Roanoke River
Chase City, VA**	900	tr. filter	520.5	Butcher Creek
Chase City, VA**	2,000	stab. pond	1,051.0	Church Creek
Chatham, VA*	1,820	prim. clarifier	511.0	Cherry Stone Creek
Clarksville, VA**	2,000	tr. filter	876.6	Blue Creek
Danville, VA**	50,000	prim. clarifier	40,541.7†	Dan River
Drakes Branch, VA*	760	Imhoff tank	56.8	Twittys Creek
Gretna, VA*	1,200	stab. pond	378.5†	Georges Creek
Halifax Mills, VA**	940	prim. clarifier	314.0†	Unnamed trib./ Roanoke River
Halifax (South Boston), VA**	1,500	prim. clarifier	302.8	Bannister River
Keysville, VA*	1,040	tr. filter	340.6	Ash Camp Creek
Martinsville VA**	22,000	ext. aer.	9,582.9†	Smith River
South Boston, VA**	11,300	prim. clarifier	5,127.1	Dan River

2. Known industrial - None

* Anonymous, 1971.
** Treatment plant questionnaire.
† More than 25% of the waste load is contributed by industry.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Roanoke River	192,120	23.0
Nutbush Creek	185	<0.1
Island Creek	2,655	0.3
Grassy Creek	2,750	0.3
Hyco River	22,525	2.7
Dan River	271,065	33.0
Banister River	26,065	3.2
Difficult Creek	1,580	0.2
Little Bluestone Creek	1,375	0.2
Butcher Creek	1,055	0.1
b. Minor tributaries & immediate drainage (non-point load) -	21,600	2.6
c. Known municipal STP's -		
Eden, NC	19,845	2.4
Henderson, NC	19,275	2.3
Madison, NC	2,040	0.2
Mayodan, NC	3,400	0.4
Reidsville, NC #1	14,740	1.8
Roxboro, NC	11,340	1.4
Walnut Cove, NC	1,245	0.2
Yanceyville, NC	1,020	0.1
Altavista, VA	4,535	0.6
Appomattox, VA #1	1,135	0.1
Bedford, VA #1	4,535	0.6
#2	2,240	0.3
Brookneal, VA #1	625	0.1
#2	625	0.1
Burlington Worsted, Clarksville, VA	18,860	2.3
Chase City, VA	1,395	0.2
Chase City, VA	4,670	0.6
Chatham, VA	2,065	0.3
Clarksville, VA	2,845	0.3
Danville, VA	83,875	10.2

Source	kg P/ yr	% of total
Drakes Branch, VA	860	0.1
Gretna, VA	1,360	0.2
Halifax Mills, VA	105	<0.1
Halifax (South Boston), VA	1,740	0.2
Keysville, VA	1,180	0.1
Martinsville, VA	49,725	6.1
South Boston, VA	19,990	2.4
d. Septic tanks* -	135	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	3,470	0.4
Total	821,850	100.0

2. Outputs -

   Lake outlet - Roanoke River 152,430

3. Net annual P accumulation - 669,420 kg.

* Estimate based on 420 lakeshore dwellings, 15 parks, and 1 campground; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
Roanoke River	3,096,260	38.6
Nutbush Creek	2,960	<0.1
Island Creek	47,250	0.6
Grassy Creek	48,560	0.6
Hyco River	378,210	4.7
Dan River	2,475,420	30.8
Banister River	578,470	7.2
Difficult Creek	36,060	0.5
Little Bluestone Creek	25,670	0.3
Butcher Creek	17,080	0.2
b. Minor tributaries & immediate drainage (non-point load) -	349,665	4.4
c. Known municipal STP's -		
Eden, NC	59,515	0.7
Henderson, NC	41,705	0.5
Madison, NC	6,120	0.1
Mayodan, NC	10,205	0.1
Reidsville, NC #1	44,215	0.6
Roxboro, NC	34,000	0.4
Walnut Cove, NC	3,740	0.1
Yanceyville, NC	3,060	<0.1
Altavista, VA	13,605	0.2
Appomattox, VA #1	3,400	<0.1
Bedford, VA #1	13,605	0.2
#2	6,715	0.1
Brookneal, VA #1	1,870	<0.1
#2	1,870	<0.1
Burlington Worsted, Clarksville, VA	122,645	1.5
Chase City, VA	2,860	<0.1
Chase City, VA	8,850	0.1
Chatham, VA	6,190	0.1
Clarksville, VA	5,325	0.1
Danville, VA	218,245	2.7

Source	kg P/ yr	% of total
Drakes Branch, VA	2,585	<0.1
Gretna, VA	4,080	0.1
Halifax Mills, VA	475	<0.1
Halifax (South Boston), VA	4,030	0.1
Keysville, VA	3,535	<0.1
Martinsville, VA	88,200	1.1
South Boston, VA	42,665	0.5
d. Septic tanks* -	5,075	0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	214,030	2.7
Total	8,028,020	100.0

2. Outputs -

Lake outlet - Roanoke River	6,721,510

3. Net annual N accumulation - 1,306,510 kg.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Roanoke River	23	369
Island Creek	15	268
Grassy Creek	16	289
Hyco River	21	345
Dan River	38	350
Banister River	17	377
Difficult Creek	9	202
Little Bluestone Creek	16	305

* Estimate based on 420 lakeshore dwellings, 15 parks, and 1 campground; see Working Paper No. 175.
** See Working Paper No. 175.

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	4.15	3.38	40.5	6.6

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of John H. Kerr Reservoir:

"Dangerous" (eutrophic loading)	1.08
"Permissible" (oligotrophic loading)	0.54

V. LITERATURE REVIEWED

Anonymous, 1971. Inventory of municipal waste facilities. EPA Publ. OWP-1, vols. 3 and 4, Wash., DC.

Bellanca, Michael A., 1975. Personal communication (lake morphometry). VA Water Contr. Bd., Richmond.

McAlister, W. Everett (District Supt.), 1975. Personal communication (wastewater treatment facilities at Eden). Eden, NC.

Neal, William E., 1969(?). Landlocked striped bass of John H. Kerr Reservoir. VA Comm. of Game & Inland Fisheries, Richmond.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
5103	CLAYTOR LAKE	0.031	0.450	434.500	5.642	14.900	0.008
5105	JOHN W. FLANNAGAN DAM	0.011	0.320	415.700	5.955	14.800	0.004
5106	JOHN H. KERR RESERVOIR	0.044	0.290	458.937	8.833	15.000	0.009
5108	OCCOQUAN RESERVOIR	0.098	0.525	459.750	12.417	15.000	0.037
5110	SMITH MOUNTAIN LAKE	0.015	0.410	414.667	11.593	15.000	0.005
5111	LAKE CHESDIN	0.044	0.240	465.778	12.556	14.800	0.008
5112	CHICKAHOMINY LAKE	0.066	0.125	455.333	13.600	9.400	0.017
5113	RIVANNA (SOUTH FORK) RES	0.079	0.475	460.222	6.667	13.000	0.022

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
5103	CLAYTOR LAKE	71 (5)	29 (2)	71 (5)	100 (7)	43 (3)	64 (4)	378
5105	JOHN W. FLANNAGAN DAM	100 (7)	57 (4)	100 (7)	86 (6)	64 (4)	100 (7)	507
5106	JOHN H. KERR RESERVOIR	43 (3)	71 (5)	43 (3)	57 (4)	14 (0)	43 (3)	271
5108	OCCOQUAN RESERVOIR	0 (0)	0 (0)	29 (2)	29 (2)	14 (0)	0 (0)	72
5110	SMITH MOUNTAIN LAKE	86 (6)	43 (3)	86 (6)	43 (3)	14 (0)	86 (6)	358
5111	LAKE CHESDIN	57 (4)	86 (6)	0 (0)	14 (1)	64 (4)	64 (4)	285
5112	CHICKAHOMINY LAKE	29 (2)	100 (7)	57 (4)	0 (0)	100 (7)	29 (2)	315
5113	RIVANNA (SOUTH FORK) RES	14 (1)	14 (1)	14 (1)	71 (5)	86 (6)	14 (1)	213

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	5105	JOHN W. FLANNAGAN DAM	507
2	5103	CLAYTOR LAKE	378
3	5110	SMITH MOUNTAIN LAKE	358
4	5112	CHICKAHOMINY LAKE	315
5	5111	LAKE CHESDIN	285
6	5106	JOHN H. KERR RESERVOIR	271
7	5113	RIVANNA (SOUTH FORK) RES	213
8	5108	OCCOQUAN RESERVOIR	72

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR VIRGINIA 02/05/76

LAKE CODE 5106 JOHN H. KERR RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 20150.2

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
5106A1	20150.2	269.01	339.80	311.49	266.18	175.56	138.75	113.27	138.75	138.75	107.60	158.57	226.53	197.78
5106A2	8381.2	121.76	141.58	130.26	113.27	67.96	53.80	48.14	56.63	53.80	45.31	67.96	93.45	82.46
5106B1	10.1	0.11	0.17	0.17	0.14	0.08	0.08	0.08	0.06	0.08	0.06	0.08	0.08	0.10
5106C1	176.1	2.27	3.11	2.97	2.58	1.53	1.02	1.02	1.02	1.02	0.91	1.56	1.73	1.72
5106D1	168.3	2.18	2.83	2.83	2.44	1.44	0.96	0.99	0.99	0.96	0.88	1.50	1.67	1.65
5106E1	1095.6	14.72	18.69	17.84	15.57	9.63	6.80	6.23	7.08	6.80	5.95	9.34	11.61	10.80
5106F1	7073.3	96.28	118.93	107.60	93.45	56.63	45.31	39.64	48.14	45.31	36.81	56.63	76.46	68.11
5106G1	1533.3	19.82	26.62	25.49	21.52	13.03	9.34	8.50	9.91	9.34	5.95	12.46	16.42	14.79
5106H1	178.2	2.27	3.11	2.97	2.55	1.53	1.02	1.02	1.02	1.02	0.93	1.59	1.78	1.73
5106K1	84.2	1.08	1.42	1.42	1.25	0.74	0.42	0.48	0.48	0.51	0.42	0.79	0.82	0.81
5106L1	58.3	0.74	0.93	0.93	0.85	0.51	0.31	0.34	0.34	0.34	0.28	0.51	0.54	0.55
5106ZZ	1391.6	19.82	26.62	25.49	21.24	13.03	9.34	8.78	9.91	9.34	8.21	12.46	16.14	14.96

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 20150.2
SUM OF SUB-DRAINAGE AREAS = 20150.2

TOTAL FLOW IN = 2383.21
TOTAL FLOW OUT = 2384.28

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5106A1	7	73	194.54	14	10.53				
	8	73	200.48	19	2.24				
	9	73	144.42	23	94.86				
	10	73	118.93	19	99.11	22	84.95		
	11	73	147.25	11	104.77				
	12	73	424.75	8	254.85				
	1	74	622.97	12	707.92	13	589.70		
	2	74	481.39	10	481.39				
	3	74	226.53	16	155.74	17	269.01		
	4	74	339.80	7	424.75				
	5	74	283.17	5	226.53	20	226.53		
	6	74	110.44	14	62.30	28	110.44		
5106A2	7	73	82.12	14	116.10				
	8	73	84.95	19	135.92				
	9	73	48.14	23	36.81				
	10	73	48.14	19	39.64	22	33.98		
	11	73	58.97	11	36.81				
	12	73	155.74	8	82.12				
	1	74	289.54	12	254.85	13	186.89		
	2	74	181.23	10	181.23				
	3	74	99.11	16	67.96	17	116.10		
	4	74	133.09	7	158.57				
	5	74	110.44	5	87.78	20	87.78		
	6	74	42.48	15	24.92				

TRIBUTARY FLOW INFORMATION FOR VIRGINIA 02/05/76

LAKE CODE 5106 JOHN H. KERR RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5106B1	7	73	0.17	14	0.11				
	8	73	0.25	19	0.57				
	9	73	0.25	23	0.20				
	10	73	0.05	19	0.05	22	0.04		
	11	73	0.00	11	0.00				
	12	73	0.03	8	0.04				
	1	74	0.06	12	0.07	13	0.05		
	2	74	0.10	10	0.10				
	3	74	0.16	16	0.11	17	0.19		
	4	74	0.07	7	0.08				
	5	74	0.07	5	0.05	20	0.05		
	6	74	0.04	14	0.02	28	0.04		
5106C1	7	73	0.40	14	0.28				
	8	73	0.51	19	1.10				
	9	73	0.48	23	0.34				
	10	73	0.91	19	0.79	22	0.68		
	11	73	0.51	11	0.34				
	12	73	1.70	8	0.62				
	1	74	1.87	12	2.15	13	1.67		
	2	74	2.46	10	2.46				
	3	74	2.46	16	1.73	17	2.97		
	4	74	1.90	7	2.12				
	5	74	1.50	5	1.19	20	1.19		
	6	74	0.79	14	0.42	28	0.79		
5106D1	7	73	0.37	14	0.23				
	8	73	0.45	19	1.02				
	9	73	0.45	23	0.34				
	10	73	0.85	19	0.74	22	0.62		
	11	73	0.48	11	0.31				
	12	73	1.59	8	0.57				
	1	74	1.76	12	2.84	13	1.56		
	2	74	2.29	10	2.29				
	3	74	2.32	16	1.64	17	2.80		
	4	74	1.76	7	2.01		(		
	5	74	1.42	5	1.10	20	1.10		
	6	74	0.74	14	0.40	28	0.74		
5106E1	7	73	4.53	14	4.53				
	8	73	5.66	19	11.04				
	9	73	4.25	23	3.11				
	10	73	0.62	19	0.51	22	0.45		
	11	73	0.74	11	0.68				
	12	73	0.82	8	0.68				
	1	74	31.15	12	39.64	13	28.32		
	2	74	24.35	10	31.15				
	3	74	14.16	16	9.91	17	16.71		
	4	74	11.89	7	11.33				
	5	74	6.80	5	2.61	20	3.68		
	6	74	1.70	14	1.47	28	1.19		

TRIBUTARY FLOW INFORMATION FOR VIRGINIA 02/05/76

LAKE CODE 5106 JOHN H. KERR RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5106F1	7	73	62.30	14	84.95				
	8	73	67.96	18	118.93				
	9	73	39.64	23	31.15				
	10	73	39.64	19	33.98	22	28.32		
	11	73	42.48	11	28.32				
	12	73	127.43	8	65.13				
	1	74	172.73	12	206.71	13	147.25		
	2	74	150.08	10	150.08				
	3	74	84.95	16	56.63	17	99.11		
	4	74	110.44	7	130.26				
	5	74	90.61	5	70.79	20	70.79		
	6	74	36.81	15	20.67				
5106G1	7	73	7.93	14	7.93				
	8	73	8.78	18	13.88				
	9	73	6.51	23	4.81				
	10	73	7.93	19	7.08	22	5.95		
	11	73	6.80	11	5.38				
	12	73	24.64	8	11.33				
	1	74	2.66	12	31.15	13	22.94		
	2	74	31.15	10	24.07				
	3	74	19.26	16	15.81	17	16.99		
	4	74	22.09	7	39.64				
	5	74	16.42	5	11.33	20	13.03		
	6	74	11.04	15	3.96				
5106H1	7	73	0.40	14	0.28				
	8	73	2.27	18	8.50				
	9	73	0.51	23	0.34				
	10	73	0.91	19	0.79	22	0.68		
	11	73	0.54	11	0.34				
	12	73	1.70	8	0.62				
	1	74	1.93	12	2.18	13	1.70		
	2	74	2.44	10	2.44				
	3	74	2.46	16	1.70	17	2.97		
	4	74	1.87	7	2.15				
	5	74	1.50	5	1.19	20	1.19		
	6	74	0.79	15	0.42				
5106K1	7	73	0.17	14	0.08				
	8	73	0.17	19	0.42				
	9	73	0.20	23	0.14				
	10	73	0.42	19	0.37	22	0.31		
	11	73	0.22	11	0.14				
	12	73	0.71	8	0.24				
	1	74	0.74	12	0.85	13	0.65		
	2	74	1.05	10	1.05				
	3	74	1.19	16	0.85	17	1.44		
	4	74	0.79	7	0.91				
	5	74	0.65	5	0.51	20	0.51		
	6	74	0.34	14	0.19	28	0.34		

TRIBUTARY FLOW INFORMATION FOR VIRGINIA 02/05/76

LAKE CODE 5106 JOHN H. KERR RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5106L1	7	73	0.08	14	0.03				
	8	73	0.11	19	0.28				
	9	73	0.08	23	0.08				
	10	73	0.28	19	0.25	22	0.21		
	11	73	0.14	11	0.09				
	12	73	0.45	8	0.15				
	1	74	0.34	12	0.54	13	0.42		
	2	74	0.71	10	0.71				
	3	74	0.85	16	0.59	17	1.02		
	4	74	0.54	7	0.62				
	5	74	0.42	5	0.34	20	0.34		
	6	74	0.24	14	0.13	28	0.24		

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/02/05

23<

510601
36 35 28.0 078 18 02.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES
3

2111202
0100 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/07	10 00	0000	13.6		35	90	7.30	27	0.050	0.300	0.240	0.005
	10 00	0004	13.5	10.6		90	7.40	27	0.040	0.300	0.240	0.006
	10 00	0015	13.1	10.4		90	7.40	27	0.050	0.200	0.240	0.006
	10 00	0040	12.4	10.1		88	7.40	29	0.060	0.200K	0.250	0.008
	10 00	0065	12.3	9.8		88	7.40	29	0.060	0.200K	0.250	0.008
	10 00	0096	11.2	9.6		88	7.40	28	0.080	0.200K	0.250	0.005
73/07/13	10 50	0000	29.1		106	102	8.60	31	0.090	0.400	0.070	0.008
	10 50	0005	29.2			102						
	10 50	0010	29.1			102						
	10 50	0020	28.9			100						
	10 50	0024	28.9	7.1		100	7.80	30	0.060	0.200K	0.050	0.005
	10 50	0030	26.8	0.4		100	6.70	35	0.090	0.200	0.170	0.007
	10 50	0035	25.3			101						
	10 50	0040	24.5			101						
	10 50	0050	22.5			90						
	10 50	0060	20.5	0.0		85	6.70	36	0.080	0.200	0.290	0.004
	10 50	0070	19.7			88						
	10 50	0080	18.7			95						
	10 50	0090	17.7			95						
	10 50	0098	16.9	0.4		103	6.90	51	0.580	0.700	0.050	0.005
73/09/26	10 45	0000	25.0	6.0	74	95	6.90	29	0.080	0.500	0.050	0.007
	10 45	0015	25.1	4.8		95	6.80	28	0.080	0.300	0.040	0.007
	10 45	0040	24.9	2.6		96	6.60	30	0.130	0.400	0.050	0.007
	10 45	0055	24.4	0.1		105	6.70	34	0.340	0.800	0.020	0.009
	10 45	0075	23.5	0.0		114	6.60	36	0.610	1.200	0.030	0.022
	10 45	0085	22.6	0.0		120	6.50	35	0.060	1.500	0.050	0.028
	10 45	0095	20.1	0.0		154	6.60	44	2.230	3.000	0.060	0.032

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

510601
36 35 28.0 078 18 02.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES 2111202
3 0100 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/07	10 00	0000	0.051	14.2
	10 00	0004	0.045	
	10 00	0015	0.044	
	10 00	0040	0.042	
	10 00	0065	0.043	
	10 00	0096	0.047	
73/07/13	10 50	0000	0.014	3.6
	10 50	0024	0.017	
	10 50	0030	0.016	
	10 50	0060	0.011	
	10 50	0098	0.037	
73/09/26	10 45	0000	0.019	5.0
	10 45	0015	0.018	
	10 45	0040	0.020	
	10 45	0055	0.030	
	10 45	0075	0.055	
	10 45	0085	0.079	
	10 45	0095	0.203	

STORET RETRIEVAL DATE 76/02/05

510602
36 27 15.0 078 22 55.0
JOHN H. KERR RESERVOIR
51 VIRGINIA

11EPALES
3

2111202
0065 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/07	10 45	0000	12.9		44	100		27	0.040	0.300	0.080	0.004
	10 45	0004	12.9	11.9		100		26	0.030	0.300	0.070	0.002
	10 45	0015	12.4	11.1		95		26	0.030	0.200K	0.100	0.003
	10 45	0040	11.5	10.3		95		27	0.050	0.200	0.170	0.003
	10 45	0060	10.4	9.2		95		27	0.080	0.300	0.160	0.004
73/07/13	14 55	0000	29.2	7.5	72	108	7.80	36	0.110	0.900	0.090	0.014
	14 55	0005	29.1			107						
	14 55	0010	29.0	7.4		107	7.70	32	0.060	0.400	0.040	0.008
	14 55	0016	28.0	4.2		106	6.70	33	0.090	0.400	0.060	0.006
	14 55	0020	27.7			104						
	14 55	0025	26.7			109						
	14 55	0030	25.9	0.0		112	6.70	33	0.140	0.400	0.080	0.009
	14 55	0035	24.5			111						
	14 55	0040	23.1			113						
	14 55	0043	22.5	0.0		118	6.70	35	0.460	0.800	0.110	0.013
73/09/26	10 15	0000	25.2	6.4	40	110	7.60	27	0.080	1.100	0.040	0.009
	10 15	0015	25.2	5.8		108	7.20	25	0.050	0.600	0.020	0.007
	10 15	0025	25.2	6.0		107	6.90	26	0.060	0.700	0.030	0.007
	10 15	0040	25.1	5.0		120	6.80	27	0.090	0.800	0.030	0.007

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

510602
36 27 15.0 078 22 55.0
JOHN H. KERR RESERVOIR
51 VIRGINIA

11EPALES 2111202
3 0065 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/07	10 45	0000	0.030	23.2
	10 45	0004	0.028	
	10 45	0015	0.023	
	10 45	0040	0.028	
	10 45	0060	0.031	
73/07/13	14 55	0000	0.026	5.2
	14 55	0010	0.022	
	14 55	0016	0.023	
	14 55	0030	0.035	
	14 55	0043	0.089	
73/09/26	10 15	0000	0.033	15.6
	10 15	0015	0.031	
	10 15	0025	0.029	
	10 15	0040	0.043	

STORET RETRIEVAL DATE 76/02/05

510603
36 35 16.0 078 25 17.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES
3

2111202
0090 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/07	12	50 0000	13.9		24	90	7.60	28	0.070	0.300	0.250	0.015
	12	50 0004	13.6	9.6		95	7.50	29	0.070	0.200K	0.250	0.013
	12	50 0015	13.4	9.4		95	7.50	12	0.080	0.200	0.240	0.014
	12	50 0035	13.2	9.2		95	6.90	28	0.100	0.200	0.270	0.011
	12	50 0065	10.8	9.0		90	7.20	27	0.110	0.300	0.270	0.010
	12	50 0085	10.3	8.8		90	7.20	27	0.140	0.500	0.280	0.010
73/07/13	11	55 0000	29.3		72	105	8.60	35	0.100	0.500	0.050	0.005
	11	55 0005	29.3			103						
	11	55 0010	29.3			104						
	11	55 0015	29.1			104						
	11	55 0021	27.4	2.2		104	6.80	36	0.100	0.300	0.160	0.007
	11	55 0025	26.4	0.6		102	6.70	36	0.080	0.300	0.350	0.008
	11	55 0030	25.4			102						
	11	55 0040	23.7			103						
	11	55 0050	22.0	0.2		100	6.80	42	0.120	0.200	0.340	0.006
	11	55 0060	20.5			96						
	11	55 0065	19.9	0.2		105	6.80	48	0.340	0.500	0.160	0.007
73/09/25	13	35 0000	25.7	6.0	72	97	6.90	36	0.110	1.100	0.060	0.011
	13	35 0015	25.6	5.8		96	6.80	36	0.070	0.400	0.050	0.008
	13	35 0030	25.4	4.6		98	6.70	36	0.100	0.400	0.060	0.008
	13	35 0045	25.2	4.6		103	6.70	37	0.130	0.400	0.060	0.008
	13	35 0060	24.0	3.0		111	6.60	38	0.220	0.600	0.120	0.013
	13	35 0078	23.5	2.2		112	6.60	40	0.260	0.800	0.130	0.022

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

510603
36 35 16.0 078 25 17.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES 2111202
3 0090 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/07	12 50	0000	0.066	4.2
	12 50	0004	0.064	
	12 50	0015	0.056	
	12 50	0035	0.049	
	12 50	0065	0.050	
	12 50	0085	0.176	
73/07/13	11 55	0000	0.018	5.3
	11 55	0021	0.017	
	11 55	0025	0.022	
	11 55	0050	0.019	
	11 55	0065	0.032	
73/09/25	13 35	0000	0.030	7.0
	13 35	0015	0.024	
	13 35	0030	0.020	
	13 35	0045	0.026	
	13 35	0066	0.050	
	13 35	0078	0.073	

STORET RETRIEVAL DATE 76/02/05

S18604
36 36 50.0 078 31 55.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES
3

21111202
0051 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/07	10 15	0000	14.4		14	85	7.50	26	0.040	0.400	0.250	0.015
	10 15	0006	14.0	9.0		85	7.50	25	0.100	0.300	0.250	0.015
	10 15	0015	13.9	9.0		80	7.50	26	0.090	0.300	0.260	0.018
	10 15	0025	13.8	9.0		90	7.50	25	0.080	0.300	0.250	0.014
	10 15	0035	13.6	9.0		85	7.50	24	0.100	0.200	0.270	0.015
	10 15	0047	13.0	8.5		81	7.50	25	0.110	0.400	0.250	0.016
73/07/13	12 00	0000	28.4			96	9.00	31	0.080	0.800	0.060	0.005
	12 00	0006	28.3	8.0		95	8.70	28	0.060	0.400	0.050	0.005
	12 00	0015	27.9	5.2		92	7.20	29	0.090	0.600	0.090	0.005
	12 00	0030	25.6	1.7		95	6.80	34	0.200	0.500	0.240	0.010
73/09/25	14 15	0000	25.6	7.4		105	6.80	36	0.050	0.800	0.060	0.011
	14 15	0015	25.5	7.4		105	6.80	35	0.040	0.400	0.060	0.009
	14 15	0025	24.6	6.4		108	6.70	38	0.070	0.500	0.050	0.009
	14 15	0030	23.4	6.0		108	6.70	39	0.140	0.600	0.100	0.015
	14 15	0036	22.6	4.0		112	6.70	38	0.170	0.600	0.140	0.016

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/07	10 15	0000	0.083	2.9
	10 15	0006	0.090	
	10 15	0015	0.089	
	10 15	0025	0.089	
	10 15	0035	0.080	
	10 15	0047	0.075	
73/07/13	12 00	0000	0.042	19.2
	12 00	0006	0.037	
	12 00	0015	0.036	
	12 00	0030	0.046	
73/09/25	14 15	0000	0.039	15.8
	14 15	0015	0.035	
	14 15	0025	0.041	
	14 15	0030	0.073	
	14 15	0036	0.093	

STORET RETRIEVAL DATE 76/02/05

510605
36 41 15.0 078 40 00.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES 2111202
3 0021 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/07	12 15	0000	14.3		14	81	7.50	23	0.080	0.400	0.230	0.030
	12 15	0006	14.0	8.9		75	7.50	22	0.070	0.300	0.230	0.026
	12 15	0016	13.9	8.9		75	7.50	23	0.080	0.300	0.240	0.024
73/07/13	10 30	0000	28.0		20	85	7.20	35	0.110	1.800	0.320	0.039
	10 30	0006	27.7	7.4		90	7.30	38	0.080	0.500	0.310	0.021
	10 30	0012	26.5	8.0		96	7.70	49	0.070	0.400	0.180	0.009
	10 30	0017	26.0	7.9		108	7.60	40	0.060	0.400	0.190	0.006
73/09/25	15 00	0000	24.1	8.0	18	115	7.00	32	0.060	0.900	0.230	0.057
	15 00	0005	24.1			114						

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/07	12 15	0000	0.082	2.6
	12 15	0006	0.101	
	12 15	0016	0.095	
73/07/13	10 30	0000	0.104	11.9
	10 30	0006	0.082	
	10 30	0012	0.046	
	10 30	0017	0.052	
73/09/25	15 00	0000	0.124	10.3

STORET RETRIEVAL DATE 76/02/05

510606
36 42 10.0 078 39 35.0
JOHN H. KERR RESERVOIR
51117 VIRGINIA

11EPALES
3

2111202
0021 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/07	13 00	0000	12.4		12	103	7.20	39	0.060	0.300	0.300	0.009
	13 00	0006	12.1	10.1		105	7.10	40	0.050	0.200	0.300	0.009
	13 00	0017	12.1	10.0		115	6.80	39	0.060	0.200	0.310	0.009
73/07/13	11 20	0000	25.2		28	112	8.10	42	0.060	1.100	0.160	0.007
	11 20	0006	24.2	6.9		113	7.50	44	0.060	0.200K	0.290	0.009
	11 20	0013	24.2	7.0		113	7.50	44	0.060	0.200	0.290	0.009
73/09/25	15 30	0000	23.4	7.8	12	120	7.00	47	0.070	0.700	0.130	0.014
	15 30	0007	23.4	7.4		120	7.00	47	0.060	0.600	0.140	0.012

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/07	13 00	0000	0.062	3.3
	13 00	0006	0.065	
	13 00	0017	0.064	
73/07/13	11 20	0000	0.045	5.3
	11 20	0006	0.044	
	11 20	0013	0.044	
73/09/25	15 30	0000	0.086	4.4
	15 30	0007	0.076	

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/02/05

5106A1
36 35 55.0 078 18 00.0
ROANOKE RIVER
51 15 BOYDTON
0/JOHN H KERR RES
SAMPLE AT 200 YDS BELO KERR DAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	12 00		0.260	0.520	0.110	0.005K	0.015
73/08/19	12 10		0.024	1.260	0.430	0.020	0.050
73/09/23	10 15		0.019	0.710	0.395	0.007	0.037
73/10/19	12 30		0.105	3.600	0.130	0.012	0.015
73/11/11	11 55		0.168	0.450	0.025	0.007	0.019
73/12/08	12 20		0.160	0.900	0.064	0.008	0.025
74/01/12	12 00		0.208	1.200	0.078	0.012	0.040
74/02/10	12 45		0.330	1.500	0.090		0.005
74/03/16	12 05		0.310	1.200	0.040	0.005	0.030
74/04/07	10 35		0.160	0.300	0.015	0.005	0.020
	12 50		0.276	0.900	0.055	0.035	0.040
74/05/05	09 05		0.200	0.200	0.060	0.010	0.030
74/05/20	13 45		0.208	0.100	0.030	0.005	0.010
74/06/14	12 20		0.232	0.200	0.025	0.005K	0.010
74/06/28	11 35		0.216	0.200	0.040	0.005K	0.015

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106A2
36 49 50.0 078 41 25.0
ROANOKE RIVER
51 HALIFAX CO HWY M
I/JOHN H KERR RES
US 360 BRDG 2.5 MI E OF CLOVER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	12 10		0.490	1.540	0.100	0.014	0.165
73/08/19	10 35		0.273	1.470	0.190	0.017	0.075
73/09/23	10 00		0.132	0.660	0.067	0.019	0.050
73/11/11	09 50		0.138	3.300	0.088	0.013	0.040
73/12/08	10 30		0.224	0.700	0.044	0.012	0.055
74/01/12	10 30		0.240	0.800	0.028	0.012	0.055
74/02/10	14 40		0.430	1.600	0.060	0.015	0.100
74/03/16	10 25		0.148	0.900	0.037	0.010	0.060
74/04/07	12 05		0.252	0.400	0.015	0.015	0.080
74/05/05	10 20		0.176	0.100	0.015	0.010	0.060
74/05/20	11 00		0.340	0.300	0.045	0.015	0.175
74/06/15	10 05		0.250	0.200	0.010	0.010	0.060
74/06/30	18 05		0.250	0.300	0.005	0.010	0.055

STORET RETRIEVAL DATE 76/02/05

510681
36 22 10.0 078 24 30.0
NUTBUSH CREEK
51 VANCE CO NC HWY
T/JOHN H KERR RES
BRDG ON FAS 1317 2 MI N OF HENDERSON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	12 45		0.075	1.470	0.021	0.008	0.085
73/08/19	10 55		0.010K	0.660	0.039	0.013	0.070
73/09/23	10 30		0.011	0.940	0.024	0.010	0.075
73/10/19	12 00		0.015	0.900	0.048	0.015	0.080
73/11/11	11 15		0.011	0.700	0.020	0.017	0.100
73/12/08	11 45		0.024	0.800	0.080	0.024	0.155
74/01/12	11 00		0.152	1.200	0.384	0.044	0.130
74/02/10	11 55		0.208	1.400	0.230	0.075	0.195
74/03/16	11 15		0.044	1.300	0.050	0.040	0.210
74/04/07	11 20		0.016	0.700	0.010	0.015	0.035
74/05/05	09 40		0.008	0.300	0.010	0.005K	0.035
74/05/20	12 15		0.012	0.250	0.015	0.005	0.027
74/06/14	11 45		0.024	0.500	0.010	0.005K	0.035
74/06/28	11 00		0.044	0.600	0.045	0.005	0.065

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106C1
36 32 57.0 078 28 00.0
ISLAND CREEK
51 15 BOYDON
O/JOHN H KERR RES
ISLAND CREEK DAM 3 MI N OF TUNGSTEN
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	10 55		0.084	2.000	0.048	0.005K	0.020
73/08/19	10 21		0.052	0.980	0.056	0.021	0.125
73/09/23	11 10		0.010K	0.640	0.019	0.013	0.075
73/10/19	11 25		0.010K	0.950	0.036	0.014	0.057
73/11/11	10 55		0.010K	0.450	0.015	0.008	0.035
73/12/08	11 15		0.016	0.500	0.016	0.012	0.050
74/01/12	10 35		0.120	1.100	0.056	0.020	0.075
74/02/10	11 20		0.140	1.100	0.070	0.015	0.045
74/03/16	10 45		0.036	1.100	0.030	0.005	0.045
74/04/07	11 50		0.048	0.500	0.015	0.010	0.010
74/05/05	10 05		0.012	0.500	0.020	0.005K	0.025
74/05/20	11 30		0.068	0.400	0.020	0.010	0.060
74/06/14	10 55		0.006	0.400	0.007	0.005	0.035
74/06/28	10 35		0.032	0.500	0.045	0.005K	0.060

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

510601
36 30 50.0 078 37 30.0
GRASSY CREEK
51 15 CLARKSVILLE
T/JOHN H KERR RES
GRASSY CK RD BRDG 5 MI NW OF STOVALL
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	10 15		0.056	1.050	0.021	0.005K	0.055
73/08/19	09 45		0.076	1.070	0.138	0.040	0.185
73/09/23	11 30		0.010K	0.630	0.017	0.010	0.035
73/10/19	11 10		0.010K	2.300	0.048	0.011	0.040
73/11/11	10 30		0.010K	0.650	0.016	0.006	0.030
73/12/08	10 55		0.012	0.750	0.020	0.008	0.052
74/01/12	10 15		0.116	1.100	0.048	0.028	0.115
74/02/10	10 50		0.176	1.300	0.080	0.015	0.085
74/03/16	10 25		0.024	1.200	0.025	0.005K	0.037
74/04/07	12 20		0.084	0.400	0.020	0.010	0.010
74/05/05	10 25		0.004	0.200	0.015	0.005	0.027
74/05/20	11 00		0.012	0.300	0.020	0.005	0.035
74/06/14	10 40		0.024	0.400	0.020	0.005K	0.015
74/06/28	10 15		0.028	0.600	0.020	0.005K	0.055

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106E1
36 39 55.0 078 45 20.0
HYCO RIVER
51 HALIFAX CO HWY M
T/JOHN H KERR RES
US 58 BRDG 8 MI E OF S BOSTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	10 10		0.560	0.720	0.039	0.040	0.120
73/08/19	09 00		0.154	1.100	0.052	0.060	0.220
73/09/23	12 57		0.010K	1.980	0.056	0.013	0.090
73/10/19	10 35		0.010K	1.400	0.085	0.022	0.085
73/11/11	10 00		0.013	1.800	0.068	0.061	0.115
73/12/08	10 25		0.024	0.400	0.036	0.024	0.165
74/01/12	09 15		0.112	0.800	0.036	0.016	0.080
74/02/10	10 15		0.148	1.600	0.060	0.015	0.070
74/03/16	10 00		0.112	1.000	0.045	0.020	0.080
74/04/07	12 45		0.108	0.400	0.025	0.030	0.037
74/05/05	10 45		0.250	0.400	0.108	0.030	0.100
74/05/20	10 30		0.184	0.700	0.045	0.040	0.200
74/06/14	10 05		0.216	0.800	0.010	0.015	0.075
74/06/28	09 55		0.384	0.600	0.030	0.005	0.075

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106F1
36 41 30.0 078 53 12.0
DAN RIVER
51 HALIFAX CO HWY M
I/JOHN H KERR RES
RT 304 BRDG IN S BONSTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	09 45		0.460	0.560	0.032	0.073	0.210
73/08/18	09 45		0.420	3.360	0.315	0.079	0.375
73/09/23	11 00		0.320	0.637	0.021	0.160	0.270
73/10/22	10 15		0.370	0.700	0.025	0.160	0.375
73/11/11	08 30		0.260	3.200	0.077	0.140	0.190
73/12/08	09 00		0.184	0.500	0.020	0.060	0.160
74/01/13	09 40		0.300	0.950	0.024	0.048	0.180
74/02/10	13 40		0.300	1.400	0.050	0.035	0.200
74/03/17	09 05		0.260	0.680	0.032	0.070	0.155
74/05/05	11 20		0.260	0.500	0.025	0.075	0.155
74/05/20	12 00		0.290	0.200	0.015	0.050	0.160
74/06/15	08 40		0.384	0.500	0.015	0.090	0.190
74/06/30	17 00		0.360	0.400	0.015	0.090	0.200

STORET RETRIEVAL DATE 76/02/05

5106G1
36 43 00.0 078 48 20.0
BANISTER RIVER
51 HALIFAX CO HWY M
T/JOHN H KERR RES
RT 716 BRDG 4.5 MI E OF S BOSTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	11 25		0.220	0.477	0.028	0.017	0.075
73/08/18	10 00		0.180	0.340	0.060	0.027	0.080
73/09/23	10 45		0.086	0.350	0.021	0.014	0.060
73/10/22	10 00		0.087	3.750	0.150	0.021	0.165
73/11/11	08 50		0.058	3.000	0.126	0.021	0.035
73/12/08	09 30		0.064	0.100K	0.020	0.012	0.040
74/01/13	10 00		0.208	0.900	0.036	0.028	0.125
74/02/10	14 00		0.240	3.400	0.205	0.010	0.063
74/03/17	09 25		0.184	1.000	0.050	0.015	0.040
74/04/07	12 40		0.208	0.800	0.055	0.025	0.105
74/05/05	11 00		0.092	0.300	0.025	0.010	0.025
74/05/20	12 00		0.120	0.200	0.020	0.015	0.065
74/06/15	09 15		0.144	0.300	0.020	0.010	0.045
74/06/30	17 30		0.148	0.400	0.025	0.010	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106H1
36 45 10.0 078 42 30.0
DIFFICULT CREEK
51 HALIFAX CO HWY H
T/JOHN H KERR RES
RT 716 BRDG 6 MI E OF SCOTTSBURG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	11 50		0.138	0.560	0.024	0.009	0.025
73/08/18	10 20		0.056	0.920	0.240	0.017	0.045
73/09/23	10 26		0.020	0.460	0.024	0.005K	0.030
73/11/11	09 30		0.010K	1.850	0.052	0.017	0.025
73/12/08	09 45		0.016	0.400	0.016	0.012	0.030
74/01/13	10 15		0.072	0.600	0.020	0.016	0.035
74/02/10	14 20		0.112	1.100	0.055	0.010	0.050
74/03/17	09 45		0.064	0.600	0.040	0.015	0.040
74/04/07	12 20		0.024	0.300	0.015	0.010	0.020
74/05/05	10 45		0.028	0.100	0.010	0.010	0.020
74/05/20	11 20		0.104	0.100	0.025	0.010	0.015
74/06/15	09 40		0.116	0.200	0.015	0.010	0.025
74/06/30	17 50		0.108	0.300	0.015	0.015	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106K1
36 41 57.0 078 34 40.0
LITTLE BLUESTONE CREEK
51 15 CLARKSVILLE
T/JOHN H KERR RES
RT 609 BRDG 2 MI SSE OF ORGANSVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	10 55		0.048	0.630	0.013	0.005K	0.045
73/08/19	13 10		0.010K	0.920	0.026	0.009	0.055
73/09/23	11 50		0.010K	0.750	0.011	0.005K	0.055
73/10/19	14 10		0.010K	1.100	0.044	0.012	0.045
73/11/11	13 10		0.010K	2.500	0.058	0.013	0.065
73/12/08	13 50		0.012	0.900	0.028	0.016	0.080
74/01/12	13 40		0.160	1.100	0.064	0.044	0.110
74/02/10	14 12		0.184	1.300	0.050	0.030	0.090
74/03/16	10 00		0.028	0.500	0.020	0.015	0.065
74/04/07	09 45		0.016	1.500	0.020	0.010	0.015
74/05/05	07 55		0.004	0.300	0.010	0.005	0.030
74/05/20	14 45		0.020	0.300	0.015	0.005	0.035
74/06/14	13 10		0.012	0.400	0.005	0.005K	0.030
74/06/28	09 20		0.032	0.650	0.010	0.005K	0.071

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/05

5106L1
36 41 57.0 078 27 30.0
BUTCHER CREEK
51 15 BOYDTON
T/JOHN H KERR RES
RT 677 BRDG 6 MI NW OF BOYDTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/14	11 20		0.390	1.150	0.087	0.060	0.105
73/08/19	12 44		0.110	1.300	0.120	0.040	0.110
73/09/23	11 00		0.031	0.230	0.011	0.042	0.075
73/10/19	13 45		0.012	1.450	0.081	0.054	0.080
73/11/11	12 45		0.017	2.800	0.100	0.092	0.120
73/12/08	13 26		0.120	0.400	0.016	0.076	0.140
74/01/12	13 15		0.116	0.400	0.024	0.028	0.055
74/02/10	13 45		0.168	1.300	0.060	0.035	0.135
74/03/16	12 30		0.016	0.700	0.015	0.015	0.045
74/04/07	10 10		0.028	0.200	0.010	0.035	0.040
74/05/05	08 15		0.140	0.500	0.045	0.025	0.055
74/05/20	14 30		0.288	0.300	0.035	0.030	0.070
74/06/14	12 55		0.184	0.300	0.015	0.025	0.050
74/06/28	12 35		0.420	0.300	0.025	0.070	0.140

STORET RETRIEVAL DATE 75/03/26

50<

5106BA TF5106BA P013500
38 28 00.0 078 30 00.0
NUT BUSH (HENDERSON)
51051 250 GREENSBORD
T/JOHN H. KERR RESERVOIR
NUT BUSH CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/06/26 CP(T)- 73/06/27	08 00		0.165	29.400	12.500	9.300	10.000	1.210	1.070
73/07/30 CP(T)- 73/07/31	08 00	07 00	0.470	30.000	8.230	7.300	12.500	1.030	0.997
73/08/29 CP(T)- 73/08/30	08 00	07 00		33.000		10.600	12.500	1.290	1.170
73/09/26 CP(T)- 73/09/27	08 00	07 00	0.840	35.000	16.800	13.700	15.000	1.170	1.120
73/10/30 CP(T)- 73/10/31	08 00	07 00	0.500	30.000	9.900	12.000	15.400	1.110	1.030
73/11/28 CP(T)- 73/11/29	08 00	07 00	0.400	20.000	4.700	7.200	9.100	1.310	0.977
73/12/19 CP(T)- 73/12/20	08 00	07 00	0.300	25.000	6.700	8.600	11.000	1.580	1.260
74/01/30 CP(T)- 74/01/31	08 00	07 00	0.200	14.000	4.800	7.500	8.900	1.710	1.660
74/02/27 CP(T)- 74/02/28	08 00	07 00	0.280	15.000	5.200	8.700	10.500	1.690	1.530
74/03/27 CP(T)- 74/03/27	08 00	07 00	0.080	18.000	4.600	7.100	9.200	1.660	1.530
74/04/29 CP(T)- 74/04/30	08 00	07 00	0.280	27.000	9.100	10.000	12.500	1.260	1.420
74/05/29 CP(T)- 74/05/29	08 00	19 00	0.200	23.000	6.700	7.700	8.300	1.590	1.490

STORET RETRIEVAL DATE 75/03/26

51<

5106FA PR5106FA P011300
36 41 45.0 078 54 00.0
CITY OF SOUTH BOSTON
51 HALIFAX CO HWY
T/JOHN KERR RESERVOIR
DAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/10/11	11 00								
CP(T)-			0.050	25.000	10.000	8.300	12.500	1.400	1.200
73/10/11	16 00								
73/11/14	11 00								
CP(T)-			0.420	22.000	4.000	5.500	14.000	1.400	1.700
73/11/14	16 00								
73/12/14	11 00								
CP(T)-			0.310	25.000	4.500	5.800	14.000	1.700	1.100
73/12/14	16 00								
74/01/17	11 00								
CP(T)-			0.800	16.000	3.900	5.150	9.900	1.500	1.000
74/01/17	16 00								
74/02/14	11 00								
CP(T)-			0.440	19.000	3.400	4.800	8.700	1.600	1.800
74/02/14	16 00								
74/03/20	11 00								
CP(T)-			0.280	15.000	3.700	3.100	4.100	1.500	1.600
74/03/20	16 00								
74/05/02	11 00								
CP(T)-			0.120	21.000	5.000	6.200	11.250	2.100	1.200
74/05/02	16 00								
74/05/15	11 00								
CP(T)-			0.080	34.000	7.350	5.700	12.000	2.000	1.280
74/05/15	16 00								
74/06/28	11 00								
CP(T)-			0.565	22.000	3.000	4.350	9.300	1.800	1.310
74/06/28	16 00								

STORET RETRIEVAL DATE 75/03/26

52<

5106FB AS5106FB P050000*
36 35 30.0 079 24 00.0
CITY OF DANVILLE
51 PITTSYLVANIA CO
T/JOHN KERR RESERVOIR
DAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/10/28	24 00								
CP(T)-			20.000	0.500K	0.095	6.800	7.600	11.700	9.360
73/10/29	24 00								
73/11/29	00 01								
CP(T)-			7.500	3.500	0.290	5.900	6.100	11.200	10.500
73/11/29	12 00								
73/12/27	24 00								
CP(T)-			19.800	1.150	0.440	4.900	5.400	11.300	10.000
73/12/28	24 00								
74/01/30	24 00								
CP(T)-			4.600	2.500	0.040K	5.500	7.700	12.400	11.400
74/01/31	24 00								
74/02/17	24 00								
CP(T)-			5.700	2.000	0.080	4.600	5.250	10.400	11.500
74/02/18	24 00								
74/03/30	24 00								
CP(T)-			4.200	3.200	0.315	4.000	4.500	8.760	10.600
74/03/31	24 00								
74/04/30	00 00								
CP(T)-			7.900	3.600	0.180	5.750	6.500	12.200	11.400
74/04/30	24 00								
74/05/29	00 00								
CP(T)-			7.560	2.200	0.130	5.000	5.300	12.400	11.100
74/05/29	24 00								
74/06/30	00 00								
CP(T)-			11.800	2.300	0.070	4.400	5.500	7.430	10.900
74/06/30	24 00								
74/07/31	00 00								
CP(T)-			16.800	2.000	0.160	4.500	5.000	11.300	10.900
74/07/31	24 00								
74/08/31			20.000	1.350	0.140	4.600	4.700	9.280	10.090
74/09/30	00 00								
CP(T)-			23.000	1.400	0.160	4.500	4.900	10.700	10.700
74/09/30	24 00								
74/10/31	00 00								
CP(T)-			16.000	1.500	0.085	4.000	4.400	11.760	10.780
74/10/31	24 00								

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/26

53<

5106GA PR5106GA P001500
36 46 25.0 078 50 30.0
TOWN OF HALIFAX, SOUTH BOSTON
51 HALIFAX CO
T/JOHN H KERR RESERVOIR
BANISTER RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/01/31	11 00								
CP(T)-			0.320	29.000	12.000	7.200	22.000	0.080	0.080
74/01/31	16 00								
74/03/01	09 00								
CP(T)-			0.320	33.000	15.000	9.700	19.500	0.080	0.080
74/03/01	13 00								
74/04/16	09 00								
CP(T)-			0.240	33.000	15.700	7.100	13.000	0.080	0.080
74/04/16	13 00								
74/05/08	09 00								
CP(T)-			0.320	39.000	20.000	7.300	10.500	0.080	0.080
74/05/08	13 00								
74/06/10	08 00								
CP(T)-			0.320	45.000	19.750	9.817	14.500	0.080	0.080
74/06/10	13 00								
74/07/11	09 30		0.240	38.000	24.000	11.000	15.000	0.080	0.080

STORET RETRIEVAL DATE 75/03/26

54<

5106MA TF5106MA P002000
36 36 12.0 078 33 50.0
TOWN OF CLARKSVILLE
51 15 CLARKSVILLE
T/JOHN KERR RESERVOIR
BLUE CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/10/01	13 30		0.560	46.000	26.000	17.490	21.000	0.225	0.141
73/11/02	13 15		0.210	16.500	0.880	8.000	14.000	0.236	0.205
73/11/30	15 15		0.070	10.000	0.590	7.300	11.000	0.226	0.210
73/12/31	13 10		0.240	49.000	13.800	7.050	10.500	0.200	0.225
74/01/31	10 30		0.320	4.400	0.130	2.850	5.500	0.350	0.300
74/03/01	13 00		0.160	5.200	0.330	5.250	6.700	0.300	0.324
74/03/29	13 45		0.040	9.000	0.690	4.600	7.500	0.256	0.205
74/05/03	15 30		0.280	18.250	4.300	3.150	6.000	0.175	0.239
74/06/03	15 15		0.320	34.000	21.000	7.400	9.450	0.175	0.190
74/08/20	08 00		0.120	12.000	0.420	5.300	7.600	0.225	0.200
74/09/26	10 30		0.100	7.600	0.410	4.450	5.800	0.271	0.250
74/10/30	08 00		0.080	5.200	0.220	3.000	3.800	0.200	0.290

STORET RETRIEVAL DATE 76/02/25

5106NA AP5106NA P000600*
36 36 30.0 078 34 00.0 4
BURLINGTON WORSTED CLARKSVILLE
51 15 CLARKSVILLE
T/JOHN KERR RESERVOIR
UNNAMED TRIB
11EPALES 2141204
0000 FEET DEPTH CLASS 00

55<

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/04/02	10 00		0.040	16.000	0.050K	0.390	2.200	4.000	3.500
74/05/01	10 00		0.080	24.000	0.530	0.320	3.500	4.200	3.900
74/06/04	10 00		0.040	24.000	0.280	0.550	4.400	4.800	3.900
74/07/02 CP(T)- 74/07/02	00 00 / 24 00		0.440	27.000	0.230	0.890	4.400	4.800	4.400
74/08/06	10 00		0.052	22.000	0.150	0.380	3.100	4.000	4.500
74/09/04	10 00		0.200	23.000	0.120	0.960	5.000	3.500	3.800
74/10/01	09 00		0.208	27.000	0.275	0.320	4.600	4.200	3.800
74/11/01	10 00		0.080	28.000	0.094	0.400	4.700	4.000	3.700
74/12/03			0.320	16.000	0.400	0.650	2.825	3.600	3.500
75/01/07	10 00		0.240	16.000	0.390	0.400	2.400	3.300	3.500
75/02/03	10 00		0.080	30.000	0.400	0.480	1.200	3.000	3.400
75/03/03	10 00		0.080	26.000	0.080	0.097	3.500	2.800	3.200

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/06

S106TA PRS106TA P000313*
36 46 20.0 078 55 00.0
HALIFAX MILL HALIFAX
51 15 HALIFAX
T/JOHN KERR RESERVOIR
UNNAMED TRIB/BANISTER RIVER/DAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/10/04	08 00								
CP(T)-			0.090	1.100	0.044	0.120	0.670	0.101	0.074
73/10/04	16 00								
74/01/10	08 00								
CP(T)-			1.160	8.700	0.290	1.090	2.800	0.101	0.100
74/01/10	16 00								
74/02/05	08 00								
CP(T)-			0.600	5.600	0.120	0.750	1.300	0.101	0.100
74/02/05	16 00								
74/03/05	08 00								
CP(T)-			0.360	1.500	0.090	0.290	0.440	0.101	0.100
74/03/05	16 00								
74/04/02	08 00								
CP(T)-			0.520	3.850	0.730	0.320	1.150	0.100	0.080
74/04/02	16 00								
74/05/07	08 00								
CP(T)-			0.680	4.400	0.180	0.190	0.450	0.101	0.100
74/05/07	16 00								
74/06/04	08 00								
CP(T)-			1.760	2.300	0.050K	0.830	0.850	0.079	0.072
74/06/04	16 00								
74/07/02	08 00								
CP(T)-			1.320	3.000	0.520	0.380	0.910	0.101	0.100
74/07/02	16 00								
74/08/13	08 00								
CP(T)-			0.680	3.300	0.079	0.260	0.420	0.080	0.070
74/08/13	16 00								
74/09/03	08 00								
CP(T)-			0.120	1.000K	0.050K	0.085	0.115	0.100	0.090
74/09/03	16 00								
74/10/08	08 00								
CP(T)-			0.260	4.300	2.200	0.275	0.590	0.054	0.050
74/10/08	16 00								
74/11/05	08 00								
CP(T)-			0.320	2.600	0.180	0.160	0.460	0.069	0.072
74/11/05	16 00								

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/06

5106TA PR5106TA P000313*
36 46 20.0 078 55 00.0
HALIFAX MILL HALIFAX
51 15 HALIFAX
T/JOHN KERR RESERVOIR
UNNAMED TRIB/BANISTER RIVER/DAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/12/10	08 00								
CP(T)-			0.080	5.000	0.210	0.190	1.200	0.095	0.079
74/12/10	16 00								
75/01/07	08 00								
CP(T)-			0.960	4.000	0.330	0.265	0.750	0.086	0.079
75/01/07	16 00								
75/02/18	08 00								
CP(T)-			0.600	2.900	0.560	0.280	0.600	0.057	0.060
75/02/18	16 00								
75/06/03	08 00								
CP(T)-			0.200		0.074	0.050K		0.108	0.096
75/06/03	16 00								
75/07/01	08 00								
CP(T)-			0.975	1.750	0.460	0.810	1.170	0.096	0.101
75/07/01	16 00								

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/26

58<

5106UA PD5106UA P022000*
36 39 55.0 079 52 15.0
CITY OF MARTINSVILLE
51 7.5 MARTINSVILLE
T/JOHN KERR RESERVOIR
SMITH RIVER/DAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/10/01	00 00		0.360	31.500	9.900	10.450	13.750	2.640	2.390
73/11/06			1.680	24.000	6.850	9.800	16.000	2.630	2.360
73/12/03			0.660	30.000	13.000	10.200	17.300	2.260	2.250
74/01/08			0.560	22.000	6.000	8.500	18.000	2.910	2.540
74/02/04			0.040	23.000	1.360	8.400	8.700	2.690	2.600
74/03/11			0.880	22.000	7.600	9.100	15.000	2.650	2.530
74/04/01	00 00		0.400	20.000	6.400	7.900	14.000	2.650	2.530
74/04/30			0.520	19.000	6.600	8.200	15.700	2.890	2.790
74/05/31			0.280	28.000	6.500	8.600	15.000	2.880	2.600
74/06/30			0.040	24.000	9.900	6.100	10.000	1.190	2.430
74/07/31			0.120	24.000	5.800	9.400	16.500	3.150	2.370
74/08/31			0.200	24.000	0.290		13.000	1.980	2.890
74/09/30			0.240	30.250	10.500	9.250	9.300	2.970	2.630

STORET RETRIEVAL DATE 75/03/26

59<

5106VA TF5106VA P000900
36 48 15.0 078 26 30.0
CHASE CITY SEWASE TREATMENT PLAN
51 MECKLENBURG CO
T/JOHN H KERR RESERVOIR
BUTCHERS CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/12/04	08	15	3.500	13.500	5.000	10.000	18.000		0.070
74/01/07	19	15	1.360	11.500	4.100	3.100	3.900	0.306	0.150
74/02/04	16	30	0.040	11.000	0.775	4.350	6.300	0.216	0.150
74/03/04			0.240	9.800	0.140	4.500	6.500	0.216	0.150
74/04/01	08	45	0.640	12.000	0.470	4.500	6.900	0.216	0.150
74/05/03	11	30	0.160	14.000	0.610	5.700	8.000	0.216	0.150
74/05/31	15	35	0.160	16.000	0.180	4.600	7.650	0.216	0.150
74/07/07	09	15	6.600	14.000	5.000	5.200	6.100	0.216	0.150
74/08/05			12.600	8.600	1.900	7.750	8.800	0.216	0.080
74/09/02	10	35	0.040	17.000	0.050K	4.750	7.200	0.216	0.150
74/10/02	11	15	0.140	12.000	0.460	6.050	7.600	0.216	0.150
74/11/04	13	45	0.080	18.000	0.085	7.250	9.800	0.216	0.150

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/26

5106WA P05106WA P002000
36 48 15.0 078 26 35.0
CHASE CITY SEWASE LAGOON
51 MECKLENBURG CO
T/JOHN H KERR RESERVOIR
CHURCH CREEK/BUTCHERS CREEK
11EPALES 2.41204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/12/04	08	30	0.440	23.000	3.400	13.000	16.000	0.216	0.216
74/01/07	20	30	0.400	10.500	2.000	5.800	7.300	0.306	0.306
74/02/04	15	30	0.040	14.000	0.066	8.100		0.216	0.216
74/03/05	09	30	2.240	24.000	3.780	4.900	8.500	0.216	0.216
74/04/01	09	15	3.840	13.000	2.600	4.100	7.100	0.216	0.216
74/05/03	10	30	4.800	26.000	6.400	5.500	10.500	0.216	0.216
74/05/31	15	30	5.200	30.000	10.000	9.200	15.000	0.216	0.216
74/07/07	21	30	0.064	1 00	0.065	2.400	3.700		0.216
74/08/05	08	30	0.080	30	0.280	4.800	6.550	0.220	
74/09/01	10	30	12.600	13.000	5.200	9.000	11.600	0.216	0.216
74/10/02	22	30	17.600	6.700	2.700	10.000	10.500	0.216	0.216
74/11/02			16.800	14.000	6.100	12.000	19.500		0.800